



## Section: Medical Surgical Nursing

### Finger grip relaxation to alleviate pain and enhance mobility in patients with tibia fractures

Nugraheni Nugraheni , Sumarno Adi Subrata, Margono Margono

#### Authors information

Department of Nursing, Universitas Muhammadiyah Magelang, Indonesia

 **Contactable email:** nugrahenisetiawan@gmail.com / Article DOI: *On process*

#### Abstract

Individuals with fractures often require time to recover, which can lead to challenges in fulfilling daily activities, especially for those with fractures in the extremities. Fractures in the upper and lower extremities can significantly impact one's ability to perform activities. These changes often include limited mobility due to pain caused by the irritation of motor and sensory nerves at the fracture site. When a fracture occurs, it can affect nerve fibers, leading to discomfort and pain. This, in turn, impacts the bones and the neurovascular system, causing pain during movement and resulting in impaired physical mobility. To manage the impact of fractures, including the pain experienced by patients both before and after surgery, various interventions are used. These include pharmacological approaches, such as analgesic medications, as well as non-pharmacological pain management techniques. One effective non-pharmacological approach is the finger grip relaxation technique. In this case, the author applied the finger grip relaxation technique to reduce the pain experienced by the patient, helping to address the problem of impaired physical mobility. The results of implementing the finger grip relaxation technique for patients with tibia fractures indicated a reduction in the pain scale, thereby improving physical mobility. With applying this intervention in the Edelwais Room at Tidar Hospital in Magelang City, it is hoped that inpatient nurses will gain increased knowledge and insight into providing effective nursing care.

**Keywords:** Medical surgical nursing; finger grip relaxation; pain; wound healing; nursing care

#### Introduction

A fracture is a break in the continuity of a bone, typically caused by trauma or physical force, determined by the type and extent of the trauma (Einhorn & Gerstenfeld, 2015). A tibia fracture refers to a break in the tibia bone, often resulting from direct trauma to the leg (A Muttaqin, 2008). In Indonesia, fracture cases are often caused by falls, traffic accidents, and trauma from sharp or blunt objects, according to Basic Health Research (RISKESDAS) conducted by the Research and Development Agency of the Indonesian Ministry of Health (Risksedas, 2018). Among 45.987 incidents of falls, 1.775 people (3.8%) experienced fractures. Similarly, out of 20.829 traffic accidents, 1.770 people (8.5%) sustained fractures, and among 14.127 cases of sharp/blunt trauma, 236 people (1.7%) suffered fractures (Aini & Reskita, 2018). According to Nurarif (2015), the causes of fractures can be classified into three categories: traumatic injuries, pathological fractures, and stress fractures. Fracture complications, as described by A Muttaqin (2008) and Smeltzer & Bare (2013), include arterial damage, compartment syndrome, fat embolism syndrome, infection, avascular necrosis (AVN), and hypovolemic or traumatic shock. Treatment for closed fractures often involves ORIF (Open Reduction Internal Fixation), a surgical procedure that involves placing internal fixation devices on the fractured bone to maintain the proper alignment of bone fragments. ORIF typically uses an intramedullary nail for long bone fractures with transfer fracture types. Perioperative management of musculoskeletal dysfunction often requires surgery to correct the problem (Smeltzer & Bare, 2013). Surgery (perioperative care) involves preoperative, intraoperative, and postoperative phases, which can be complex and stressful for the patient. Preoperative patients may experience anxiety, which can affect their physiological response, leading to increased pulse and respiratory rates, uncontrolled hand movements, moist palms, restlessness, repetitive questioning, difficulty sleeping, and frequent urination. Proper preparation during the surgical period can reduce surgical risks and improve postoperative recovery.

Fracture patients, particularly those with fractures in the extremities, often require time to recover and may experience difficulties in performing daily activities (Syokumawena, Mediarti, & Janianti, 2018). Fractures in the upper and lower extremities can lead to limited activity due to pain caused by the irritation of motor and sensory nerves in the fracture area (Andri, Febriawati, Padila, & Susmita, 2020). The Edelwais Room at Tidar Regional General Hospital in Magelang City is one of the surgical units that treats fracture patients with physical activity challenges. Weakness in the extremities can significantly impact the ability to perform daily activities, as the extremities are the most active and

important parts of the body for such tasks (Syahrim, Azhar, & Risnah, 2019). Fractures can disrupt nerve fibers, leading to pain and neurovascular complications, resulting in pain during movement and impaired physical mobility (Taufik, Sitio, Elvin, & Reubiyana, 2022). If not addressed promptly, ongoing disruptions in activity can lead to additional complications.

To address the nursing problem of impaired physical mobility, nurses can use pharmacological interventions, such as analgesic medications, or non-pharmacological pain management techniques like the finger grip relaxation technique. Holding fingers while breathing slowly (relaxation) can reduce physical and emotional tension, as this technique warms the points of energy entry and exit along the meridians (energy channels) located in the fingers. The reflex points on the hand provide spontaneous stimulation when gripping, sending a kind of shock wave or electrical impulse to the brain. The brain processes these impulses and relays them to the nerves in the affected body organs, helping to clear blockages in the energy pathways (Sugiyanto, 2020). The finger grip relaxation technique is one of many non-pharmacological therapies that can be an easy and effective option for patients to reduce pain and complement their primary treatment. According to research conducted by Indrawati & Arham (2020), the finger grip relaxation technique has been shown to reduce pain intensity in post-fracture surgery patients. Based on this evidence, the author is interested in applying the finger grip relaxation technique in managed cases to reduce the pain scale during physical activity, thereby helping to alleviate the problem of impaired physical mobility in these patients.

## Case Description

Nursing assessment is the initial stage of the nursing process, involving the systematic collection of data from various sources to evaluate and identify the client's health status. This assessment forms the basis for providing nursing care tailored to the client's needs. A thorough and systematic assessment, grounded in the client's actual condition, is crucial for formulating an accurate nursing diagnosis and delivering appropriate care based on the individual's responses (Olfah & Ghofur, 2016). In the case of a patient with a tibia fracture and impaired physical mobility, general data collected during the nursing assessment includes the patient's identity, such as name, age, gender, address, education, occupation, ethnicity, religion, date of hospital admission, medical record number, and medical diagnosis. The assessment for this particular case was conducted on Monday, October 9, 2023, at 07:15. The client had been involved in a motorcycle accident and was taken to Tidar Regional Hospital in Magelang City. Upon admission, the patient was conscious, had no vomiting, but reported pain in the right leg. Vital signs were recorded as follows: blood pressure 112/76 mmHg, pulse 81 bpm, temperature 36.5°C, and respiration 20 breaths per minute. The reason for the patient's hospitalization, Mrs. L, was a cruciate fracture of the tibia resulting from the traffic accident. The patient reported no history of hypertension or diabetes mellitus and had no prior medical history. The current treatment regimen includes an asering infusion at 20 drops per minute, ranitidine injection 2x1 ampoule, and ketorolac injection 3x 30 mg. The assessment revealed that the patient experienced disturbed rest and sleep due to pain, although the pain was partially managed with 3x 30 mg ketorolac injections. The patient required assistance from nursing staff for daily activities, including eating, toileting, personal hygiene, and dressing. Muscle strength was assessed, with scores of 5 for the right and left upper extremities, 5 for the lower left extremity, and 0 for the lower right extremity. Similarly, movement scores were 5 for the right and left upper extremities, 5 for the lower left extremity, and 0 for the lower right extremity.

A radiological examination conducted on October 9, 2023, revealed a complete fracture of the proximal tibia os dextra (intra-articular) with fragmentation and contraction. Based on the assessment, the following nursing problems were identified: On October 9, 2023, the primary issue was impaired physical mobility (D0054) related to damage to the integrity of the bone structure, characterized by difficulty moving the right leg, increased pain when moving the right leg, limited movement, decreased right leg muscle strength, and reduced range of motion (ROM). On October 10, 2023, the diagnosis was updated to physical mobility disorder (D0054) related to pain, characterized by difficulty moving the right leg, pain upon movement, reluctance to move, limited mobility, decreased muscle strength in the right leg, and reduced ROM. Nursing interventions on October 9, 2023, included plans for mobilization support and pain management. On October 10 and 11, 2023, interventions were expanded to include mobilization support, ambulation support, and continued pain management. The author applied non-pharmacological pain management techniques, specifically finger grip relaxation, both before and after surgery. The results of this technique were as follows: On October 9, 2023, pre-operative patients reported a reduction in pain, with the scale decreasing from 6 to 5. On October 10, 2023, following ORIF surgery, the pain scale decreased from 7 to 6. On October 11, 2023, the pain scale dropped further from 6 to 5. Pain was assessed using the Numerical Rating Scale (NRS), where patients rate their pain on a scale from 0 to 10. This scale is effective for assessing pain intensity before and after therapeutic interventions.

## Discussion

Providing nursing care to Mrs. L, who has a medical diagnosis of a tibia fracture and impaired physical mobility, focused on the application of the Finger-Hold Relaxation Technique to reduce her pain scale. This care was provided continuously from the time she was admitted to the hospital until her discharge. In preparing this final scientific work

for nurses, the author began by conducting a thorough assessment of the patient, utilizing the 13 NANDA domain assessment framework. Pain was assessed using the PQRST method, while the pain scale was evaluated using a numerical scale. Data collection for Mrs. L was conducted on October 9, 2023, prior to her surgery. Subjectively, the patient reported difficulty moving her right leg and increased pain when attempting to do so. Objectively, the assessment revealed limited movement, decreased muscle strength in the right leg, and reduced range of motion (ROM). Based on these findings, the author concluded that the primary issue for Mrs. L was impaired physical mobility, with the diagnosis code D0054. The etiology of this problem was identified as damage to the integrity of the bone structure. This conclusion aligns with the definition provided in the SDKI DPP PPNI Working Group Team (2017), which states that physical mobility impairment (D0054) is characterized by subjective symptoms such as difficulty moving extremities, and objective signs such as decreased muscle strength and ROM.

The cause of the impaired physical mobility was attributed to Mrs. L's tibia fracture, as confirmed by the radiological examination, which showed a complete fracture of the proximal tibia with fragmentation and contraction. Previous research suggests that direct trauma or pathological conditions leading to fractures can result in discontinuity of bone tissue, bone deformities, and impaired extremity function, all of which contribute to physical mobility issues (Nurarif & Kusuma, 2015). On October 10, 2023, the patient's condition remained consistent, with the primary issue being impaired physical mobility (D0054). However, on this day, the author identified pain as the cause of the mobility problems. This conclusion was based on the symptoms and signs observed in Mrs. L, including difficulty moving her right leg, decreased muscle strength, reduced ROM, pain upon movement, reluctance to move, limited movement, and expressions of pain, especially after her ORIF surgery for the proximal tibia fracture. These observations align with the major and minor symptoms of physical mobility impairment. Additionally, it is well-documented that the ORIF surgical procedure can cause post-operative pain, further hindering the patient's ability to move (Reeves, 2011). The nursing care plan for physical mobility impairment includes mobilization support, ambulation support, and pain management. The intervention plan for Mrs. L involved pain management, which included both pharmacological and non-pharmacological techniques. In collaboration with medical personnel, analgesics were administered, and non-pharmacological techniques, specifically the Finger-Hold Relaxation Technique, were applied. This technique involves holding the patient's fingers for 15 minutes, resulting in a reduction of the pain scale from 6 to 5. The patient's calmer demeanor following the intervention further supported the effectiveness of this technique. The findings align with research by Indrawati & Arham (2020), which describes the Finger-Hold Relaxation Technique as a simple and effective method for reducing physical and emotional tension by stimulating energy pathways in the body, ultimately leading to pain relief.

The evaluation of Mrs. L's condition on the first day of treatment, October 9, 2024, at 19:00 WIB, showed that the goal of reducing impaired physical mobility (D.0554) related to bone structure damage was partially achieved. The pain scale decreased from 6 to 5 after the application of the Finger-Hold Relaxation Technique. On the second day, October 10, 2024, at 19:00 WIB, with the same diagnosis but a different etiology (pain), the pain scale decreased from 7 to 6 following the intervention. The patient appeared calmer as well. On the third day of treatment, October 11, 2024, at 12:00 WIB, the issue of impaired physical mobility related to pain was also partially resolved. The pain scale decreased from 6 to 5, and the patient appeared more comfortable, allowing her to begin ambulating with the assistance of crutches. The results of using the Finger-Hold Relaxation Technique for Mrs. L with a tibia fracture have proven effective in reducing pain, both before and after surgery. From the three days of patient management, starting from the initial admission with a diagnosis of tibia fracture to post-operative care, it was concluded that the primary issue faced by Mrs. L was impaired physical mobility, albeit with different underlying causes. However, pain persisted throughout her hospitalization, acting as a barrier to resolving the mobility issues.

In addressing Mrs. L's nursing problems, the involvement of the ward nurse and the support of her family were crucial. Observations showed that the ward nurse effectively applied deep breathing relaxation techniques alongside the medical therapies provided. However, the nurse's limited knowledge of other complementary therapies that could easily be applied to reduce pain meant that deep breathing was the primary non-pharmacological method used. Family support was also a significant factor in Mrs. L's care. Her family actively participated in helping her apply the Finger-Hold Relaxation Technique after she mobilized and ambulated. One of the strengths of this case study is the multidisciplinary involvement, including doctors, nurses, physiotherapists, and nutritionists, all of whom contributed to the patient's management. The person in charge provided the author with the freedom to conduct assessments, allowing for comprehensive patient management from admission to discharge. The author was also able to apply the Finger-Hold Relaxation Technique throughout the patient's care, providing a valuable comparison of its effectiveness in pre- and post-operative settings. The ward nurse's support in implementing the author's nursing plan further strengthened the case study. However, a limitation of this case study is that the author applied the Finger-Hold Relaxation Technique to only one patient, preventing a broader comparison of its effectiveness across multiple patients with similar conditions at the same time.

## Conclusion

This study focused on the nursing care provided to a patient admitted with a tibia fracture, who subsequently underwent surgery. The research evaluated the effectiveness of a non-pharmacological intervention, specifically the Finger-Hold Relaxation Technique, in managing pain both before and after surgery. The findings demonstrated a noticeable decrease in the pain scale following the application of this technique, highlighting its potential as an effective pain management strategy. The Finger-Hold Relaxation Technique, being simple and easy to perform, offers valuable insights and practical skills for inpatient nurses. It can also be beneficial for patients and their families, empowering them to participate in pain management. While this study was limited to a single patient, the results suggest that broader application and further research involving multiple patients would provide a more comprehensive assessment of the technique's effectiveness across similar cases. Future research should aim to expand on these findings to better understand the broader applicability and benefits of this intervention.

## References

- A Muttaqin. (2008). *Buku ajar asuhan keperawatan klien gangguan sistem muskuloskeletal*. Jakarta: EGC.
- Aini, L., & Reskita, R. (2018). Pengaruh Teknik Relaksasi Nafas Dalam terhadap Penurunan Nyeri pada Pasien Fraktur. *Jurnal Kesehatan*, 9(2), 262. <https://doi.org/10.26630/jk.v9i2.905>
- Andri, J., Febriawati, H., Padila, P., J, H., & Susmita, R. (2020). Nyeri pada Pasien Post Op Fraktur Ekstremitas Bawah dengan Pelaksanaan Mobilisasi dan Ambulasi Dini. *Journal of Telenursing (JOTING)*, 2(1), 61–70. <https://doi.org/10.31539/joting.v2i1.1129>
- Einhorn, T. A., & Gerstenfeld, L. C. (2015). Fracture healing: mechanisms and interventions. *Nature reviews. Rheumatology*, 11(1), 45–54. <https://doi.org/10.1038/nrrheum.2014.164>
- Indrawati & Arham. (2020). Pengaruh pemberian teknik relaksasi genggam jari terhadap persepsi nyeri pada pasien post operasi fraktur. *Jurnal Keperawatan* (2020), 2507(Febru), 1–9.
- Nurarif & Kusuma. (2015). *Aplikasi Asuhan Keperawatan Berdasarkan Diagnosa Medis & NANDA (North American Nursing Diagnosis Assosiation) NIC – NOC*. Yogyakarta: Mediacion Publishing.
- Nurarif, A. H. (2015). (2015). *Aplikasi Asuhan Keperawatan Berdasarkan Diagnosa Medis dan Nanda Nic-Noc Edisi Revisi Jilid 3*. Jogjakarta: Mediacion Publishing Jogjakarta.
- Olfah, Y., & Ghofur, A. (2016). *Modul Bahan Cetak Kebidanan Dokumentasi Keperawatan*. Pusdik SDM Kesehatan: Jakarta.
- Reeves, G. R. (2011). *Keperawatan Medical Bedah, Setyomono Joko, (Penterjemah)*. Jakarta: Salemba Medika.
- Riskesdas. (2018). *Badan Penelitian dan Pengembangan Kesehatan Kementerian RI (2018)*.
- Smeltzer, S.C. & Bare, B. G. (2013). (2013). *Buku Ajar Keperawatan Medikal Bedah Brunner & Suddarth*, edisi 8. Jakarta: EGC.
- Sugiyanto. (2020). Penurunan Intensitas Nyeri Pada Pasien Pasca Operasi Melalui Teknik Relaksasi Genggam Jari di RSUD Sawerigading Palopo. *Jurnal Kesehatan Luwu Raya*, 6(2), 55–59.
- Syahrin, E. P. W., Azhar, U. M., & Risnah, R. (2019). Efektifitas Latihan ROM Terhadap Peningkatan Kekuatan Otot Pada Pasien Stroke: Study Systematic Review. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, 2(3), 186–191. <https://doi.org/10.56338/mppki.v2i3.805>
- Syokumawena, Mediarti, D., & Janianti, N. (2018). (2018). Implementasi Keperawatan Pasien Post Operasi Fraktur Ekstremitas Bawah Dengan Masalah Gangguan Mobilitas Fisik. *Jurnal Keperawatan Merdeka (Jkm)*, 2(2), 52–59.
- Taufik., Sitio, R., Elvin, S. D., & Reubiyana, Z. (2022). Pemberian Rom Aktif Terhadap Tingkat Kemampuan ADL Dasar Pada Pasien Post Fraktur Ekstremitas Bawah Dengan Tindakan Orif Di Rumah Sakit Umum Daerah Dr. Zain. *Jourkep: Jurnal Keperawatan*, 1(1), 1–10.